

WHAT IS CLAIMED IS:

1. A device comprising:

(a) a housing and

(b) a support confined by said housing,

said housing comprising a well having walls and at least one wall extending from an area adjacent the edge of said well, the height of said walls being at least great enough, and the design of said at least one wall being such, that liquid contained in said well is not drawn out of said well to any substantial degree.

2. A device according to Claim 1 wherein said at least one wall is designed such that corners thereof are radiused or are distant from the edge of said well to substantially eliminate wicking of said liquid from said well.

3. A device according to Claim 1 wherein said at least one wall is at least partially sloped in an area thereof adjacent said well.

4. A device according to Claim 1 wherein the height of said walls of said well is at least about 0.010 inches.

5. A device according to Claim 3 wherein said at least one wall is sloped from the edge of said well to a top portion of said housing.

6. A device according to Claim 3 wherein a ledge extends from an edge of said well to the sloping portion of said at least one wall.

7. A device according to Claim 6 wherein the width of said ledge is about 0.050 to about 1.00 inches.

8. A device according to Claim 3 wherein said at least one wall comprises a partially sloped portion in an area adjacent said ledge and a vertical portion extending from said partially sloped portion to a top portion of said device.

9. A device according to Claim 3 wherein said at least one wall is fully sloped from said ledge to the top portion of said housing.

10. A device according to Claim 6 wherein said ledge is rectangular in shape about said well.

11. A device according to Claim 6 wherein said ledge is circular in shape about said well.

12. A device according to Claim 1 wherein said at least one wall is a circular wall extending from the edge of said well to the top portion of said device.

13. A device according to Claim 1 wherein said at least one wall is a circular wall extending from a ledge adjacent the edge of said well to the top portion of said device.

14. A device according to Claim 1 wherein said device comprises at least two walls that are fully sloped from a ledge adjacent the edge of said well to the top portion of said device.

15. A device according to Claim 14 wherein said device comprises two opposing walls that are fully sloped from a ledge adjacent the edge of said well to the top portion of said device and two opposing walls extending vertically from said ledge to said top portion.

16. A device according to Claim 14 wherein said device comprises four walls that are fully sloped from a ledge adjacent the edge of said well to the top portion of said device.

17. A device according to Claim 3 wherein said partially sloped wall is sloped at least about 35 degrees.

18. A device according to Claim 3 wherein said at least partially sloped wall is sloped at about 30 to about 55 degrees.

19. A device according to Claim 6 wherein said ledge comprises a polished surface that prevents wicking of a liquid along said ledge.

20. A device according to Claim 1 wherein a surface of said support comprises a plurality of biopolymers.

21. A device according to Claim 20 wherein said biopolymers are polynucleotides.

22. A device according to Claim 3 wherein the slope of said partially sloped wall is constant.

23. A device according to Claim 3 wherein the slope of said partially sloped wall is continuously changing.

24. A device according to Claim 1 further comprising a cover.

25. A device according to Claim 1 wherein said at least one wall is designed such that any corners thereof are distant from the edge of said well by about 0.1 inch to about 1 inch.

26. A method for mixing materials on the surface of a support, said method comprising:

(a) placing at least one reagent on the surface of the support of the device of Claim 1, said surface having at least a residual amount of a sample thereon and

(b) directing a stream of gas at the surface of the support, said stream being of a pressure and at an angle to create a vortex on said surface sufficient to mix said sample and said at least one reagent.

27. A method according to Claim 26 wherein the angle of said stream is about -3 to -20 degrees with respect to the horizon.

28. A method according to Claim 26 wherein the pressure of said stream is about 1 to about 3 psig.

29. A method according to Claim 26 wherein said gas is air or nitrogen.

30. A method according to Claim 26 wherein said stream is directed at a centerline of said surface.

31. A method according to Claim 26 wherein said stream is directed at a point that is offset from a centerline of said surface.

32. A method according to Claim 26 wherein said stream is oscillating.

33. A method according to Claim 32 wherein said stream is oscillating from said centerline to an edge of said surface.

34. A method according to Claim 32 wherein said stream is oscillating about said centerline.

35. A method according to Claim 26 wherein said at least one reagent is a washing solution.

36. A method for mixing materials on the surface of a support, said method comprising:

(a) placing at least one reagent on the surface of the support of the device of Claim 1, said surface having at least a residual amount of a sample thereon and

(b) subjecting said device to motion sufficient to mix said sample and said at least one reagent.

37. A method according to Claim 36 wherein said motion is orbital or linear.

38. A method according to Claim 36 wherein the intensity of said motion is about 0.10 inches per second to about 1.0 inches per second.

39. A method for carrying out a binding reaction, said method comprising:

(a) incubating a sample with the surface of the support of the device of Claim 20,

(b) removing said sample from said surface wherein a residual amount of said sample remains,

(c) contacting said surface with a wash solution,

(d) directing a stream of gas at the surface of the support, the pressure of said stream and the angle of said stream creating a vortex on said surface sufficient to mix said sample and said wash solution, and

(e) removing said wash solution from said surface.

40. A method for detecting the presence of a target polynucleotide in a sample, said method comprising:

(a) incubating a sample suspected of containing a target polynucleotide with the surface of the support of the device of Claim 21,

(b) removing said sample from said surface wherein a residual amount of said sample remains,

(c) contacting said surface with a wash solution,

(d) directing a stream of gas at the surface of the support, the pressure of said stream and the angle of said stream creating a vortex on said surface sufficient to mix said sample and said wash solution,

(e) removing said wash solution from said surface, and

(f) examining said surface for the presence of a binding reaction between said polynucleotides thereon and said target polynucleotide, the presence thereof indicating the presence of said target polynucleotide in said sample.

41. A method according to Claim 40 wherein the results of step (f) are forwarded to a remote location.

42. A method for detecting the presence of a target polynucleotide in a sample, said method comprising:

- (a) incubating a sample suspected of containing a target polynucleotide with the surface of the support of the device of Claim 21,
- (b) washing said surface to remove said sample therefrom, and
- (c) examining said surface for the presence of a binding reaction between said polynucleotides thereon and said target polynucleotide, the presence thereof indicating the presence of said target polynucleotide in said sample.

43. A method for mixing materials on the surface of a support, said method comprising:

- (a) placing at least one reagent on the surface of the support, said surface having at least a residual amount of a sample thereon and being substantially free from an evaporation layer and
- (b) directing a stream of gas at the surface of the support, the pressure of said stream and the angle of said stream creating a vortex on said surface sufficient to mix said sample and said at least one reagent.

44. A method according to Claim 43 wherein the angle of said stream is about -3 to -20 degrees with respect to the horizon.

45. A method according to Claim 43 wherein the pressure of said stream is about 1 to 3 psig.

46. A method according to Claim 43 wherein said gas is air or nitrogen.

47. A method according to Claim 43 wherein said stream is directed at a centerline of said surface.

48. A method according to Claim 43 wherein said stream is directed at a point that is offset from a centerline of said surface.

49. A method according to Claim 43 wherein said stream is oscillating.

50. A method according to Claim 49 wherein said stream is oscillating from said centerline to an edge of said surface.

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51. A method according to Claim 49 wherein said stream is oscillating about said centerline.

52. A method according to Claim 43 wherein said at least one reagent is a washing solution.

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53. A method for mixing materials on the surface of a support, said method comprising:

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(a) placing at least one reagent on the surface of the support, said surface having at least a residual amount of a sample thereon and

(b) directing a stream of gas at or between the centerline and the edge of the surface of the support, the pressure of said stream and the angle of said stream creating a vortex on said surface sufficient to mix said sample and said at least one reagent.

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54. A method according to Claim 53 wherein the angle of said stream is about -3 to -20 degrees with respect to the horizon.

55. A method according to Claim 53 wherein the pressure of said stream is about 1 to 3 psig.

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56. A method according to Claim 53 wherein said gas is air or nitrogen.

57. A method according to Claim 53 wherein said stream is directed at a centerline of said surface.

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58. A method according to Claim 53 wherein said stream is directed at a point that is offset from a centerline of said surface.

59. A method according to Claim 53 wherein said stream is oscillating.

60. A method according to Claim 59 wherein said stream is oscillating from  
5 said centerline to an edge of said surface.

61. A method according to Claim 59 wherein said stream is oscillating about  
said centerline.

62. A method according to Claim 53 wherein said at least one reagent is a  
washing solution.

63. An apparatus for elevating the temperature adjacent a support comprising  
biopolymers bound to a surface thereof, said support being housed in a coverless  
15 container, said apparatus comprising:

- (a) a housing,
- (b) a chamber within said housing, said chamber being adapted to receive  
said coverless container, and
- (c) at least one heating element for elevating the temperature adjacent said  
20 support.

64. An apparatus according to Claim 63 wherein said housing comprises:

- (a) a top portion comprising a top wall and a downwardly depending wall,  
the inner surface of said top wall being adapted to sealingly engage a top portion of said  
25 coverless container, and
- (b) a bottom portion adapted to engage said downwardly depending wall of  
said top portion such that said chamber is formed by the engagement of said top portion  
and said bottom portion,  
wherein one of said top portion and said bottom portion comprises a heating element.



65. An apparatus for heating a support comprising biopolymers attached to its surface, said support being contained in a coverless container, said apparatus comprising:

(a) a top portion comprising a top wall and a downwardly depending wall, said top wall comprising on its inner surface a circumferential groove having an O-ring seated therein, said top portion comprising a heating element, and

(b) a bottom portion adapted to engage said downwardly depending wall of said top portion, said bottom portion comprising a heating element, wherein the engagement of said top portion and said bottom portion forms an inner chamber for housing said coverless container and wherein said inner surface of said top portion seals said coverless container by engagement of said O-ring with a top surface of said coverless container.

66. An apparatus according to Claim 65 wherein said top heating element and said bottom heating element are adapted to be independently activated.

67. An apparatus according to Claim 65 wherein said bottom portion comprises a peripheral indentation for engaging said downwardly depending wall of said top portion.

68. A method for heating a liquid on a support, said method comprising creating a temperature gradient on opposite sides of said support, said temperature gradient being sufficient to substantially reduce condensation of said liquid during said heating.

69. A method according to Claim 68 wherein said support is housed in a coverless container.

70. A method according to Claim 69 wherein said coverless container is in a chamber of a housing and wherein two heating elements are positioned on opposing

sides of said support and wherein said temperature gradient is produced by activating said heating elements with different levels of energy.

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